

REMARKS

Claims 1 - 12 remain active in this application. No new matter has been introduced into the application. The indication of allowability of claim 4 is noted with appreciation.

This application has been pending for almost four years and this request for reconsideration is filed in response to the fifth office action (including the lengthy Advisory Action of February 25, 2004) after reopening of prosecution following the filing of Appellant's Brief on Appeal. The present office action applies prior art first cited in the first office action of March 17, 2003, in the application but not previously applied in that action or any intervening action. Accordingly, since the prosecution of this application has become protracted, **supervisory review is respectfully requested in accordance with M.P.E.P. §707.02.**

The withdrawal of all previous grounds of rejection is noted with appreciation. However, it is noted that the rejection of claims 6 and 7 remains based on Hibbs et al. but is now made under 35 U.S.C. §103 rather than §102 while claims 8 - 12 are newly rejected based on Hibbs et al. in view of Davis (cited March 17, 2003 but not previously applied) notwithstanding the arguments made in the response filed January 26, 2004, (paragraph bridging pages 8 and 9) that, under the precedent of *In re Gordon*, 221 USPQ 1125 (Fed. Circ., 1984), Hibbs et al. cannot be properly modified to answer the claim recitations regardless of what additional prior art the Examiner might seek to apply in combination therewith; to which argument the Examiner has not responded in any way.

Further, in this regard, the Examiner notes a reference on pages 6 and 7 of that response to an inconsistency of the Examiner's evaluation or

interpretation of the references applied and the Hibbs et al. reference in particular but asserts that the inconsistency has not been pointed out. On the contrary, it is respectfully submitted that the inconsistency is detailed on pages 8 and 9 of that response and is further discussed on pages 15 - 17 of Appellant's Brief on Appeal. Specifically, and in summary thereof, it was pointed out that while it is believed that Hibbs et al. does not fairly teach a plurality of sub-fields, even if portions of the pattern of Hibbs et al. are considered to comprise sub-fields, the features of such sub-fields of Hibbs et al. would even more clearly fail to answer the sub-field features recited in the claims since, under such an interpretation of Hibbs et al., the sub-fields would have only a single feature or be featureless. In any case, the pattern of Hibbs et al. is not capable of producing Moiré patterns or the meritorious effects of the invention based thereon and would not be capable of functioning in the manner intended if modified to do so (which neither Hibbs et al. or any other prior art of record in any combination teaches or suggests).

Claims 1 - 3 have been rejected under 35 U.S.C. §102 as being anticipated by Davis and Claim 5 has been rejected under 35 U.S.C. §103 as being unpatentable over Davis. These grounds of rejection are respectfully traversed, particularly since the optical system of Davis has virtually nothing to do with the optical system or target of the invention.

Specifically, Davis is directed to a type of imaging technique referred to as multiplexed imaging which, as an alternative to use of a single sensor and scanning over the image to capture a single pixel at a time, a sequence coded masks are used one at a time (see column 6, lines 39 - 44) to selectively block portions of the image with each mask while measuring the radiant flux, P , with a single sensor or detection

channel (see column 3, lines 59 - 64, and column 6 lines 20 - 26), which is allowed to pass through each mask from the entire image area. The individual pixels of the image area can then be reconstructed (e.g. by solving N equations corresponding to N exposures with N different masks to obtain the respective values of N discrete pixels) once a sufficient number of measurements of radiant flux through the masks is made (see column 4, lines 8 - 12). The pixels disclosed in Davis are of a constant size and pitch referred to as tiles, A, and mask regions are of a corresponding area or multiples thereof. This technique thus uses a relatively higher level of radiant flux for each of the masks and thus raises sensor efficiency (see column 6, lines 27 - 39). Davis also teaches the refinements of such a technique of using reflective areas rather than opaque areas of the masks in combination with two sensors which thus allow exposures using complementary mask patterns to be made simultaneously which can be directly differenced (column 8, lines 42 - 47) and for the mask patterns to be developed with one-dimensional patterns which are orthogonally oriented to develop a "virtual two-dimensional mask" as Moiré patterns of the two superposed masks to thereby reduce the number of masks which must be prepared. These refinements of the basic multiplex imaging technique are discussed at column 8, lines 11 - 51.

In summary, Davis is directed to a technique for effectively resolving pixels using a single sensor which is inherently incapable of doing so due to receiving radiant flux potentially from any location within the entire image area and which requires that the transparent and opaque/reflective areas of the mask which may be developed as a Moiré pattern by optical superposition of plural masks be equally optically distinct among all masks. By the same token, if individual masks are used in Davis, there will be no

Moiré patterns developed anywhere in the system, much less produced as an artifact of imaging and, conversely, if overlaid masks are used, Moiré patterns will and must be uniformly present and, for that reason, no information is developed or conveyed by the presence, absence or minimization of Moiré patterns in Davis and any such development of information which could be obtained through any modification of Davis would preclude the operation of Davis in the manner intended by altering the mask function. Moreover, the masks are necessarily used singly or in overlaid superposition such that they do not form a target having a plurality of sub-fields and clearly do not have or present a progression of sizes and pitches of features over a range which encompasses the resolution of an imaging system (e.g. since the objective of Davis is to resolve all of the pixels in the imaging area to which the mask areas in Davis necessarily correspond).

As explained many times in previous responses, the invention is directed to measuring the resolution of an imaging system whereas Davis is only directed to an imaging technique, *per se*, and develops an arbitrary degree of resolution based directly on the (uniform) size of tiles, A, reflected in the masks. The invention measures resolution by imaging a target containing plurality (thus simultaneously imaged) of sub-fields having a progression of feature sizes and pitches which cause Moiré patterns as artifacts in all sub-fields except in sub-fields where the pixel pitch of the sensor substantially matches the feature pitch, as imaged on the sensor, thus yielding a measurement of imaging system resolution by inspection of an image of the plural sub-fields of the target. Davis does not, in fact teach or suggest any of: 1.) the target having a plurality of sub-fields, 2.) a progression of feature sizes and pitches in the respective sub-fields or 3.) that the feature sizes and pitches cover a range

encompassing the resolution of the imaging system. All Davis teaches of any relevance to the present invention is the mere presence of the term "Moiré pattern" describing a composite mask pattern rather than an image produced in a much different way for a much different purpose. Therefore, it is clearly seen that Davis does not, in fact, anticipate any claim in the application and no *prima facie* demonstration of anticipation of any claim has been made.

In regard to claim 5, it is respectfully submitted that the Examiner is substantially relying upon reference numerals in Figure 3. That these numerals are not imaged should be abundantly clear from the fact that the sensor(s) of Davis are exposed and respond to the entire radiant flux transmitted from the image area via each mask and imaging additional data, particularly of random opaque/reflective area and location as is inherent with images of consecutive numbers would prevent an accurate and consistent measurement of radiant flux being made corresponding to the respective masks. Therefore, Davis must be considered as teaching away from the imaging of any sort of identifying legends and thus Davis does not teach or suggest the subject matter of claim 5 or provide evidence of a level of ordinary skill in the art that would support the conclusion of obviousness which the Examiner asserts and no *prima facie* demonstration of obviousness has been made. Accordingly, it is respectfully submitted that both grounds of rejection based on Davis, alone, are clearly in error and reconsideration and withdrawal of the same is respectfully requested.

Claims 6 and 7 have been rejected under 35 U.S.C. §103 as being unpatentable over Hibbs et al. taken alone and claims 8 - 12 have been rejected under 35 U.S.C. §103 as being unpatentable over Hibbs et al. in view of Davis. Both of these grounds of rejection are also respectfully traversed.

The deficiencies of Hibbs et al. to answer the recitations of the claims has been repeatedly discussed in detail in previous responses, all of which are hereby fully incorporated by reference. In summary, Hibbs et al. is directed to calibration of grey scale exposure for lithography and has nothing to do with measurement of resolution of an imaging system. The pattern of Figure 1 (referred to by Hibbs et al. as a Starikov pattern or exposure monitor) which has only a single pitch and a single instance of a doubled size of a single feature and which is explicitly indicated as being required to be below the resolution limit of the lithography tool in order to be rendered as a (stepped) grey scale. If, *arguendo*, each region in the pattern is considered to be a sub-field, the sub-fields would have only a single feature each. The additional patterns disclosed by Hibbs et al. are deficient to answer the claims in the same manner except that if the individual regions are considered to the sub-fields, the sub-fields would be featureless by virtue of which the regions need not be of sub-resolution size.

The Examiner admits that Hibbs et al. does not teach encompassing the spatial resolution of the imaging system but asserts that doing so would be obvious to provide a desired line-to-space ratio. However, Starikov patterns having feature pitches larger than the lithographic resolution would be inoperative to be rendered as a grey scale and such a modification to answer the recitation admittedly absent from Hibbs et al. would thus prevent operation of the Starikov pattern in the manner intended negating any possible motivation for such a modification and no motivation is present in the remainder of Hibbs et al. since size/pitch of a partially transparent, partially opaque region has and can have no effect on the grey scale rendered. On the contrary, possible fringing and refraction effects at region sizes near the resolution

limits contrary to the patterns actually disclosed by Hibbs et al. could cause irregularities in the image produced. Hibbs et al. does not teach or suggest anything that would result in the production of Moiré patterns and does not provide evidence of a level of ordinary skill in the art which would support a conclusion of obviousness, particularly for the reasons asserted by the Examiner which clearly indicate that impermissible hindsight has been employed. Again, any modification of Hibbs et al. which would support resolution measurement in an imaging system would prevent the operation of Hibbs in the intended manner and thus be improper under 35 U.S.C. §103 under the precedent of *In re Gordon*, *supra*. Therefore the rejection of claims 6 and 7 based on Hibbs et al. taken alone, is clearly improper and fails to *prima facie* demonstrate the subject matter of the claims to be obvious.

Moreover, while it was previously pointed out and reiterated above that any modification of Hibbs et al. which would answer the claims would be improper, modification of Hibbs et al. in accordance with Davis (or vice-versa) would be particularly improper since modification of either Hibbs et al. or Davis in accordance with the other would prevent operation in the intended manner and furthermore, would still fail to answer the salient recitations of the claims as discussed above. Additionally, it is respectfully submitted that these references taken together do not provide evidence of a level of ordinary skill in the art which would support a conclusion of obviousness such as that asserted by the Examiner since they do not lead to an expectation of success in measuring resolution of an imaging system by inspection through imaging a target having the features claimed which cause presence or substantial absence of Moiré patterns in respective sub-fields depending on the closeness of

the match of the pitch of pixels on the sensors and the pitch of features in respective sub-fields as imaged on the sensor. Accordingly, it is respectfully submitted that the rejections of claims 6 - 12 are clearly in error and, upon reconsideration, should be withdrawn.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered and shown to be in error and/or inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 C.F.R. §1.111(b) and such reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



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